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THE WEEKLY SUMMARY OF CURRENT SCIENCE •

January 6, 1940

President, AAAS

See Page 4

A SCIENCE SERVICE PUBLICATION

Do You Know?

Corn is the best source of oil of all grain crops.

Forest fire fighters may drop from parachutes, if tests with especially designed 'chutes and protective clothing prove satisfactory.

The U. S. Weather Bureau is stationing men on American merchant ships in the North Atlantic to make observations and report on flying weather.

Hunting deer with aid of music is occasionally done in Europe — violinists kneeling in the bushes play, within shooting distance of the game.

Quebec is trying new paint for white lines on highways: containing ground glass, the paint reflects headlights at night making traffic lanes highly visible.

Ruins of Palmyra in the Syrian desert are the chief visible remnant of the empire-building ambitions of Syrian Queen Zenobia, who fought to expand her holdings into a huge Arab empire.

Two geography teachers at Syracuse University declare that the average student entering their general geography course is unable to locate on a map one-third of the States in the Union.

Stranded in the United States by war conditions, Dr. Wladyslaw Gorcynski, a former chief of the Polish Weather Bureau and noted authority on solar climates, is now doing research at the Scripps Institution of Oceanography, La Jolla, California.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

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PUBLIC HEALTH

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A stream of bats pouring out of an underground opening led to the discovery of New Mexico's remarkable Carlsbad Caverns.

Scientists have been working out a system of evaluating different types of coal, as an aid to those using coal for various purposes.

Angora rabbits would produce wool five to eight inches long in a year, but they are usually sheared four times a year in commercial practise.

Italy is greatly increasing the area devoted to cotton growing.

With gasoline restricted, gondolas in Venice are again driven by an old-fashioned oar.

Virginia creeper will cling to rough brick or stone; Boston ivy will cling even to smooth painted brick.

A substitute for turpentine developed in Germany is reported to be just as good as real gum spirits of turpentine.

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PHYSICS

A.A.A.S. $1,000 Prize Given For Research on the Atom

Ingenious Method for Obtaining Exact Information On Spin of Nucleus Brings Honor to Prof. I. I. Rabi

FOR USE of ultra-short radio waves in an ingenious method for obtaining information, more exact than ever obtained before, on what goes on within the atom, Prof. I. I. Rabi, of Columbia University, was honored with the annual thousand-dollar prize of the American Association for the Advancement of Science.

Prof. Rabi is another physicist to whom distinction has come at an early age. Only 41 now, he was awarded the Sigma Xi prize in physical science in 1936 and joined the faculty of Columbia University in 1930 when he was in his very early thirties. Prof. Rabi was born in Austria, but came to the United States as an infant.

Atoms can act like little radio transmitters broadcasting on ultra-short waves between 40 centimeters and 1.5 meters in length, Prof. Rabi told the American Physical Society in his prize report at the meeting of the American Association for the Advancement of Science in Columbus.

The atom "broadcasts," Prof. Rabi said, are being used to detect the energy difference within the atom for different atomic states. Not only does an atom transmit such waves but it can absorb them. By applying these short radio waves to atoms passing down his apparatus Prof. Rabi and his colleagues find specific energies absorbed which make the atoms go from one atomic state to another; states in which they possess detectable differences in magnetic properties. The transition point is sharp and very exact. It provides knowledge of the spins of the atom nucleus and its associated electrons with an exactness 100 times greater than ever before.

The powerful research method, called radio frequency spectrum analysis, also gives indication of the magnetic moments of atoms for it is known that the nuclei of atoms behave like tiny magnets.

At the meeting Prof. Rabi, with Drs. P. Kusch and S. Millman, described studies on the radio frequency spectrum of the two varieties of lithium having mass six and seven. With these and other scientists Prof. Rabi has previously reported other investigations, particularly studies on heavy hydrogen. They have found that the electric charge of the heavy hydrogen nuclei is egg-shaped or possesses a quadrupole moment.

In these experiments a stream of neutral atoms in the form of a narrow ribbon moves through a high vacuum so that the atoms suffer no collisions with one another or with atoms of a different species. Their speed is just the speed of their natural thermal motion. This stream of atoms passes by two magnets successively in which they are deflected first in one way and then in the opposite direction, and finally impinges on a detecting device which measures the numbers of atoms which arrive per second. In the space between these two magnets the atoms are subjected to the action of radio waves. When the wave length of the radio waves corresponds to the energy difference between two of the possible atomic states, the atom passes from one of these states to the other. It thereupon undergoes a change in magnetic properties. As a result, it no longer pursues the same path, when it passes by the second magnet, as it would have without this change, and no longer strikes the detector. The effect of the radio waves is thus observed as a decrease in the number of atoms which arrive at the detector.

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To Probe Radio Spectra Of Radioactive Atoms

By DR. I. I. RABI

Columbia University, Winner of A.A.A.S. $1,000 Prize

THE new field of research recognized by the prize, concerned with the radio spectra of atoms and molecules, was developed by the study of fine details of atomic, molecular and nuclear structure. By this means the strengths of nuclear magnets of many atoms were measured.

The shape of the deuterium (heavy hydrogen) nucleus was also determined. Contrary to expectation it turned out to be like a football spinning on its long axis.

PROF. I. I. RABI

In the future other nuclei, including those of radioactive elements, will be studied. These studies will give fundamental information about the forces that govern nuclear properties. The use of radio waves in studying molecular structure will reveal details which cannot be detected by other means. This is shown by the results obtained with hydrogen molecules.

Science News Letter, January 6, 1940

BACTERIOLOGY

Bacteria Digest Shells Of Lobsters and Crabs

LOBSTER and crab shells, which are deposited in the ocean by billions of tons every year as their owners moult or die, are composed of one of the toughest and most indigestible organic substances known, chitin. Yet there are bacteria that do the useful work of disposing of this waste material and returning its chemical elements to general circulation.

This was described to the American Association for the Advancement of Science at Columbus.

Dr. Charles W. Hock of the Woods Hole Oceanographic Institution, who described these bacteria, stated also that they are found in the digestive tracts of various kinds of fish, as well as squid, sand crabs and oysters. He suggested that they may aid in the digestion of the shells of crustacea eaten by these sea creatures, which might otherwise prove a bit troublesome as "roughage."

Science News Letter, January 6, 1940

BIOLOGY—GENERAL SCIENCE

Geneticist Named President Of American Association

Dr. A. F. Blakeslee, Carnegie Institution Scientist, Made Possible New Plants Through Use of Colchicine

LARGER and better fruits and vegetables will soon be on the dinner tables of America as the result of the experimental evolution research that has been done by the new president of the American Association for the Advancement of Science, Dr. A. F. Blakeslee. For years he has studied the chromosomes, the tiny particles within the cells that carry heredity, and as a by-product of this intensive exploration he developed a means of producing new plants that promises large economic results.

Working at the famous Department of Genetics of the Carnegie Institution of Washington located at Cold Spring Harbor, Long Island, New York, a research center that he now directs, Dr. Blakeslee has used within the last two years a chemical called colchicine, obtained from the autumn flowering crocus, to create in the laboratory new species of plants that nature has never known.

His original experiments were done on the jimson weed, but the methods developed are now being used on tobacco, pears, peaches, lettuce, berries, and flowers. Several new kinds of flowers are expected to be available to gardeners and florists this year as a result of the application by other scientists of methods worked out by Dr. Blakeslee.

The chemical treatment with colchicine causes a doubling of the chromosomes of a plant. This makes it possible for a desirable plant to be crossed with another and produce fertile offspring. The improved plant produced breeds true, that is, perpetuates its own kind faithfully, a trait necessary for commercial growing in garden, field and hothouse. Heretofore when an extraordinary plant was created in nature or experimentally it was only infrequently possible to so capture the desirable qualities in the germ plasm as to perpetuate the desirable novelty.

Dr. Blakeslee has recently found that colchicine, applied to leaves, stems and seeds as a water solution or salve, can also eliminate chromosomes as well as double them. This allows a juggling of the hereditary characteristics of plants in such a way that to a large extent plants can be designed, like a new kind of skyscraper, and then built to order.

Science News Letter, January 6, 1940

GRAFTED

The U. S. Department of Agriculture station at Beltsville, Md., is one of many centers where research is being pushed on the effects of colchicine first explored by Dr. Blakeslee. Here a colchicine-altered peach twig has been cut off, grafted onto a peach root, and is being set out to grow eventually into a full-sized peach tree of a new variety.

• Must Carry On the Torch

Dr. A. F. Blakeslee, Carnegie Institution geneticist, newly elected president of the American Association for the Advancement of Science, prepared at the request of Science Service this inaugural statement to his fellow scientists and to the public.

"American science needs no message from one who has been elected president of the American Association for the Advancement of Science. In this country as in other lands, science has developed along with the development of freedom of thought in many lines of human interest.

"Science is advanced by an army of many soldiers, who cannot work entirely alone. Consciously or unconsciously each is influenced by the most recent investigations of his contemporaries, such as are reported at meetings of the American Association for the Advancement of Science, and each, in his incursions into the unknown, is guided by the discoveries of the past.

"The duty of science, now as always, is to blaze trails through the forest of ignorance, to make the unknown known. Society can aid in this campaign against ignorance by seeing to it that freedom of thought and its expression is maintained, since only with such freedom can truth most successfully be sought.

"Science knows no bounds of nationality or creed. In these days, when freedom of thought is threatened in many places, American science has an especial duty to carry on the torch which has been passed down to us from other hands and other ages and to offer what aid we may to our science brothers in other lands where conditions for work are less friendly."

MATHEMATICS

Mathematicians Think of Everything As Rubber

TOPOLOGY, which you won't find defined in the ordinary dictionary, was on the tip of mathematical tongues at the Columbus science meetings. This new geometry is as popular with the mathematicians as exploration of the atom is with physicists.

To those who are used to Euclidean geometry such as taught in school, this relatively new branch of mathematics, bulking large in the science meetings, will seem strange.

As explained on behalf of the American Mathematical Society by Prof. G. Baley Price of the University of Kansas, you must think of all sorts of objects in the Land of Topology as made of rubber. It is not necessary to keep the distance between each two points unchanged when two figures are compared. It is expected that the two figures will be stretched and distorted in any manner so long as they are not torn or glued together in new places. Any two

figures which can be made to coincide by such stretchings and distortions are said to have the same topological properties.

In Euclidean geometry there are right angled triangles and equilateral triangles, but in topology all triangles are the same. If the two triangles be thought of as cut from a sheet of rubber, they can be stretched until they coincide. The surface of a sphere is topologically different from the surface of a doughnut, because no deformation without tearing will change a sphere into the surface of a doughnut. The fact that a figure is made up of several disconnected pieces is a topological property; such a figure is distinct from one consisting of a single piece, for it is not permitted to glue the parts together when they are compared. Although distinct in Euclidean geometry, a sphere and an egg-shaped surface are the same in topology.

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MEDICINE

High Blood Pressure Reduced By Kidney Extract Cocktail

Extract From Whole Healthy Organ Believed to Supply Substance Missing From Kidney of Hypertension Patients

COCKTAILS made of the extract of healthy kidneys will bring back from the point of death, patients suffering from high blood pressure, it was reported to the American Association for the Advancement of Science by Dr. Arthur Grollman, of the Johns Hopkins University School of Medicine and Drs. Tinsley R. Harrison and John R. Williams, Jr., of Vanderbilt University School of Medicine. The extract may be to patients with high blood pressure what liver is to the anemic.

Physicians at the meeting welcomed this promise of a new life-saver for thousands of sufferers from high blood pressure, killer of more men and women, than any other disease. Even cancer, tuberculosis and syphilis are not so destructive of human life as is this condition known to physicians as hypertension.

Tried first on rats, the kidney extract brought the blood pressure of those with hypertension down to normal. On normal rats, however, there was no lowering of blood pressure, and no toxic or other objectionable effects were observed even when the dose was set at four times that taken by the rats with hypertension.

In rats in which the kidney had been cut off to produce experimental hypertension, the extract has another effect. These animals, for whom the high blood pressure was evidently a necessary condition for life, fell into a state of apathy, vomiting, and staggering and died.

The extract is not yet ready for use as a medicine, Dr. Grollman warned the physicians, until further research and testing has been conducted. About twelve human cases ranging in age from 36 to 60 have already received the treatment and have been brought out of a state of coma bordering on death when the blood pressure was brought down to normal.

If you are suffering from high blood pressure, don't bother to make yourself kidney stew. Eating kidneys won't lower your blood pressure, Dr. Grollman explained, because unlike rats, humans haven't a ravenous enough appetite to eat the quantity of whole kidneys necessary for the medicinal effect. And, besides, humans like their food after cooking, which would destroy the medicinal value. The extract is not difficult to take by mouth; in alcohol it is said to be quite palatable.

Apparently very similar in action to the extract used by Dr. Grollman and his associates is another substance reported for the same purpose by Dr. Irvine H. Page, of the Lilly Laboratory for Clinical Research of Indianapolis City Hospital.

Renin, a substance contained in the kidney, Dr. Page told the meeting, reacts with a substance in the blood to produce a third substance christened angiotonin. When either renin or angiotonin is injected into the blood stream, an inhibitor is liberated, and such an inhibitor also has its origin in the kidney. These inhibitors (or inhibitor) serve to counteract renin and prevent or cure hypertension.

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INSECTS AT MEETING

Colonies of 2,000 bedbugs and 3,500 croton bugs, or German roaches attended the science meetings in Columbus. They were an insect exhibit by Ohio State University demonstrating how insecticides are tested. As the roaches breed, babies fall through to a tray below and are scooped up in celluloid dishes like the one held here by Dr. H. A. Waters, Columbus entomologist. These young insects are used for the insecticide tests.

CHEMISTRY

Chemists Seek To Synthesize Bone Marrow Substance

Isolation of "Mother" of White Blood Cells That Fight Disease Is First Step Toward Synthesis

CHEMISTS of Oberlin College are on the trail of the bone marrow substance which is the "mother" of the body's white blood cells that fight disease.

Prof. Harry N. Holmes, with Ruth E. Corbet and W. B. Geiger, told the American Association for the Advancement of Science at Columbus of their success in concentrating crystalline substances from the bone marrow of cows after the high fatty fraction (85%) has been extracted by saponification.

Among these nearly pure crystalline substances, it is believed, is the mother substance which creates the white blood cells, the granulocytes.

"It is important to medicine," said the scientists' report, "that this mother substance be isolated in pure form so that formulas and structures can be determined as a step on the way to the synthesis of this material. It is already known that the white cells are closely related to the non-saponifiable fraction of marrow."

The current report describes the microanalysis and the chemical properties of the crystalline bone marrow products. Biochemical testing with animals is now in progress.

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Fats from Paraffin

ALSO at the scientific sessions was the report of Dr. Willy Lange of the University of Cincinnati on the methods of producing fatty acids — from which can be made edible fats and soaps—from paraffin wax, a petroleum product.

Large-scale production of what corresponds to a synthetic lard is now in operation in Germany, Dr. Lange reported.

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Universities Get Patents

PROTECTION of the public and the proper commercial development of inventions constitute the only interest of leading American universities in patenting discoveries made by scientists in their laboratories, Prof. A. A. Potter, dean of engineering, Purdue University, told the Association.

Dean Potter said it has become increasingly apparent that the altruistic method of dedicating patents to the "free use of the public" is one of the surest ways of assuring that the patent and invention will not be developed.

Sixteen of the nation's leading schools, which have created a patent policy to control the inventions which their staff members may make, cooperated with Dean Potter in his survey of applied research in academic institutions. These universities and schools own 380 patents and 114 of them are in active use, he disclosed. Only five universities report income from patents.

The aim of universities is to create an unexploitative commercialization of a patent which has value to the public.

"The fact that the income accruing to educational institutions from patents is insignificant," said Dean Potter, "indicates that the incentive for discovery and invention in colleges and universities is not financial reward but is involved in the fair and equitable recognition of creative genius and of aid given by industry to research."

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SOCIOLOGY

Cultural New Deal Urged to Bring Order

A NEW way of looking at the universe and man's place in it was urged upon the scientific world by Lawrence K. Frank, of the Josiah Macy Jr. Foundation, New York, before the American Association for the Advancement of Science. Such a cultural new deal is needed to bring order into our society and personal lives. Until we have such new formulation of our motivating ideas, we must continue to live anxiously and contingently, he contended.

Mr. Frank, considering the essential concepts and beliefs that make up what we call "culture," finds that recent scientific knowledge has not been utilized adequately in shaping our motivating ideas suitable for living in a dynamic, changing world.

Four great problems that men at all times have had to face need new interpretation, in his opinion. These are:

1. How the universe arose or was created, how it operates, who or what makes things happen and why.

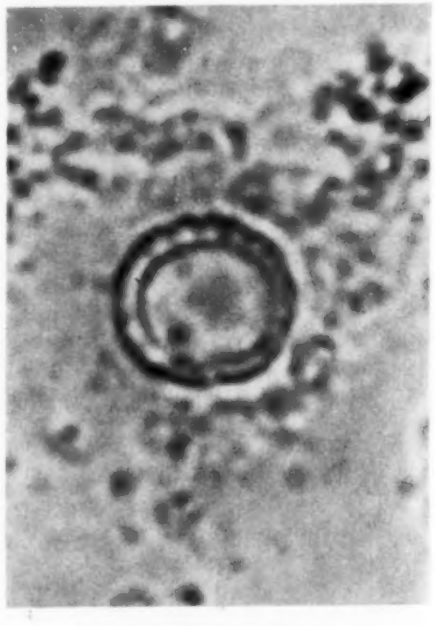
2. Man's origin, nature and destiny, his relation to the world, and whether he is a part of nature or outside it.

3. The relation of the individual to the group, who must be sacrified for whom, the individual's rights and obligations.

4. What man wants and what he should have, human nature, human conduct, human motives, how he should be educated and made a part of the community.

Science has given new answers to all these problems in recent years but most of the people do not know them. And those who know, often do not feel them. For this reason, Mr. Frank considers the rebuilding of our culture the most insistent task before us.

"The task of constructing a new framework of concepts and beliefs to give order, meaning, and significance to life becomes ever more insistent," he



COTTON FIBER

This photomicrograph taken by Dr. Wanda K. Farr, of the Boyce Thompson Institute for Plant Research, shows "native" cellulose particle formation in living colorless plastids.

said. "But it must be clearly recognized that this is essentially an artistic task, of creating a consistent picture of the universe and of man that will not only satisfy our new criteria of credibility, but also express the new aspirations and sensibilities through which we seek to attain the enduring human values."

Mr. Frank predicted that in coming years the discovery of origin of man and man's development of culture will be recognized as the greatest of discoveries.

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BIOLOGY

Woman Scientist Discovers How Plants Make Cellulose

Under Powerful Microscopes, Dr. Wanda K. Farr Saw And Photographed the Formation From Concentric Rings

DR. WANDA K. FARR

DISCOVERY of how the living plant makes cellulose, one of the fundamental materials of our civilization, was reported to the American Association for the Advancement of Science in Columbus.

Dr. Wanda K. Farr, director, Cellulose Laboratory sponsored by the Chemical Foundation at the Boyce Thompson Institute for Plant Research at Yonkers, N. Y., is the discoverer. At the age of 44, she has added to previous achievements this identification of the origin of elusive cellulose in the cotton plant.

Cellulose is the structural stuff out of which all plant "skyscrapers" are built. All of us use it daily because it is the principal stuff out of which nature makes wood, cotton fibers, and almost every other plant structure. This paper you are reading is largely cellulose. And cellulose from cotton or wood is used in the manufacture of rayon, explosives, the transparent stuff your cigarettes are wrapped in, movie film, and hundreds of other things. Even coal, fossil sunshine of past ages, is basically cellulose.

Dr. Farr observed the formation of cellulose particles in colorless disc-like structures within the plant, called plastids. Five years ago tiny cellulose crystals, barely visible egg-shaped particles, four by six hundred-thousandths of an inch, were discovered by Dr. Farr in many kinds of living cells.

This sudden appearance of cellulose crystals in living plant cells was a mystery until the new discovery now reported. Under powerful microscopes, at magnifications of 2200 and 4500 diameters, Dr. Farr was able to both observe and photograph the formation of cellulose particles.

Concentric rings of varying diameter but equal thickness are formed within the plastids. Then these rings disintegrate into the cellulose particles of uniform size. These travel to the wall of the cells and help build it.

New impetus will be given by Dr. Farr's discovery to the attack on the many difficult problems concerned with the synthesis of carbohydrates in the living cell. This matter of how the living plant uses the energy of the sunshine to build food and other materials out of carbon, oxygen and hydrogen of soil, air and water might be called the green earth's most important manufacturing operation.

For almost a century microscopists have observed the formation of starch, the food reserve of plants, in the plastids of living cells. Starch is one of the most common and most conspicuous constituents of living protoplasm.

But cellulose, important constituent of the plant framework, was found by Dr. Farr to be formed in a way quite different from the manner in which starch is made.

The formation of cellulose was first found by Dr. Farr in the protoplasm or jelly of the large, single-celled, green algae that live in the ocean. In specimens of this plant named *Halicystis,* obtained from Bermuda, she detected the cellulose crystals being formed in its green chloroplasts. This kind of cellulose was not the normal sort, but it was mercerized cellulose, the same as produced industrially by the treatment of ordinary cotton fibers with solutions of strong sodium hydroxide.

Since the discovery of mercerization of cotton by John Mercer in 1844 this shiny cotton has been produced and worn without any inkling that it was being produced naturally in any living plant.

From this first indication of the way cellulose is manufactured in nature, Dr. Farr proceeded to investigate the cotton plant and in it identified the normal or unmercerized kind of cellulose in the process of creation.

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PHYSICS

Manufacture Radium By Atom Smashing

MAN-MADE radium has been produced by transmutation of the common element, bismuth, with the University of Michigan cyclotron, Drs. J. M. Cork, J. Halpern, and H. Tatel reported to the American Physical Society at Columbus.

Deuteron particles, that is, ions of heavy hydrogen of atomic mass 2, were driven at high energy by the cyclotron against the heavy element bismuth. Out of the bombardment came Radium E and Radium F, the latter discovered by Madame Marie Curie and known as polonium.

Radium E and Radium F occur in nature, are radioactive and emit alpha particles. These particles, too, were found to be emitted by the man-made radium.

The transmutation of bismuth into Radium E appeared more easily accomplished than the transmutation into polonium. Four atoms of Radium E were created for every one of the polonium, Radium F.

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Attempts to accustom elk and wild pigs to the climate near Moscow is being made at a Soviet research farm.

A new cotton twine developed by a government chemist is pronounced satisfactory for use in postoffices.

MEDICINE

Sulfanilamide in Blood Keeps It Free from Germs

SULFANILAMIDE, powerful chemical remedy for a host of germ-diseases, is now being used to make blood transfusions safer. A small amount of sulfanilamide added to blood that is to be stored in blood banks for future transfusions prevents the growth of bacteria in the blood for from 10 to 15 days and may even make the blood completely germ-free. Details of the method are reported by Dr. Milan Novak, of the University of Minnesota (*Journal, American Medical Association,* Dec. 16).

Some of the serious reactions occurring after blood transfusions may be due to unsuspected germs in the blood given, Dr. Novak points out. Blood for transfusion is always tested for syphilitic infection before use. Tests for other germs which may lurk in the blood of healthy donors are not always made. Germs can also get into the blood when it is drawn from the donor or in preparing it for storage, in spite of precautions that are always taken against such contamination.

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PUBLIC HEALTH

League of Nations Ready To Act Against Typhus

THE LEAGUE of Nations, regardless of the action taken on the Finnish-Russian situation or other international conflicts, announces that it is ready to act if typhus fever, malaria or dysentery break out, as feared, this winter as a result of unsettled conditions throughout Europe.

Dr. R. Gautier, director of the Health Organization, has completed a tour of the Balkan countries, undertaken because the Rumanian Health Minister had pointed out the danger of epidemics, particularly of typhus fever, entailed by the influx of refugees and the presence of a floating population around the Rumanian borders. Besides the dangers of typhus and dysentery epidemics, it is feared that refugees who are completely non-immune to malaria may contract the disease in its aestivo-autumnal form.

The European Balkan countries, it is now announced, "are, in principle, favorable to concerted action under the auspices of the Health Organization" of the League of Nations, and arrangements have been made for it to be notified immediately of any epidemic foci that may appear. Measures have already been taken to help the Rumanian Health Administration to procure the extra stores and equipment required for prevention of typhus fever.

International meetings scheduled under League auspices on syphilis, malaria, nutrition and other health problems had to be postponed because of war, but "the regular, permanent work of the Health Organization has proceeded unimpeded."

Arrangements have been made among the governments concerned to safeguard the transmission of wireless bulletins to headquarters from the Singapore Bureau, which speeds vital information of epidemic disease conditions in the Far East.

Assurances of continued support have been received from various health administrations, experts and scientific institutions throughout the world.

From the Pasteur Institute of Algeria, Prof. Edmond Sergent advised that the Institute is continuing its experiments on the use of synthetic anti-malarial drugs, its trial tests with controlled vaccination against typhus fever, its work on B.C.G. in tuberculosis, and preparation of a textbook for unification of malaria terminology. The aim, says Prof. Sergent, is for "all men of goodwill to rally to the support of the Health Organization in an effort to assert the preeminence of intellectual work as a means of promoting the welfare of all."

Science News Letter, January 6, 1940

ICHTHYOLOGY

Salmon Taken For a Ride To Get Around a Dam

MORE than 50,000 salmon were taken for a ride last fall, in the Pacific Northwest. It was a long ride for some of them—as much as 150 miles, from below the Grand Coulee dam now under construction to favorable points for laying their eggs in the upstream waters. Successful completion of the operation has just been reported by the U. S. Bureau of Fisheries.

Plans for operation after the completion of the dam include the capture and stripping for eggs of thousands of salmon, and the planting of the partially incubated eggs in natural hatching waters. However, the ahead-of-schedule state of construction created an emergency this season, which was met by the transfer upstream, in refrigerated tank trucks, of salmon ripe for spawning.

Science News Letter, January 6, 1940

IN SCIEN

GEOLOGY—ASTRONOMY

Hot Sun Caused Ice Ages; Cold Sun Would Dry Earth

GLACIAL periods on the earth have been due to changes in the sun's radiation, states Sir George Simpson, eminent British meterologist, in the annual report of the Smithsonian Institution.

However, these big chills have come not when the sun, now known to be a variable star, was growing cooler, but when it was throwing out more heat.

It works out this way: the increased heat causes increased evaporation from the oceans; this in turn produces greater precipitation. Near the poles, this precipitation piles up as snow that packs and solidifies into ice—and the Ice Age is on the way.

If the sun puts a damper on its radiation for a long period, evaporation slows down and the lands become dry. We are living in such a cold, dry epoch now, Sir George holds.

Science News Letter, January 6, 1940

BOTANY

Fatherless Cotton Bolls Produced With Chemical

PRODUCTION of normal bolls of cotton from unpollinated flowers was described by Dr. J. C. Ireland of Oklahoma Agricultural and Mechanical College to the American Association for the Advancement of Science.

Using the same growth-promoting substances that have been employed to induce formation of seedless fruits, all the way from holly berries to watermelons, Dr. Ireland treated the pistils of cotton flowers after the stamens had been removed. Both fiber and seed developed normally, he reported; the only differences observed were in the embryo plants within the seeds.

Dr. F. G. Gustafson of the University of Michigan, pioneer worker in this "fatherless" fruit production, told how he had grown side-by-side crops of ordinary and unpollinated tomatoes. There was no observable difference between the two products.

Science News Letter, January 6, 1940

E FIELDS

AGRICULTURE

Sulfanilamide for Plants Promotes Their Growth

NEWEST discoveries on sulfanilamide, potent chemical remedy for many human germ diseases, come from the plant world. This chemical which, fortunately for human lives, checks the growth of bacteria, on the contrary stimulates the growth of tobacco plant roots.

"Plants receiving from 20 to 40 parts per million of sulfanilamide produced new roots from one to three days earlier than similar plants deprived of the chemical," Dr. Ernest L. Spencer, of the Rockefeller Institute at Princeton, N. J., reported.

Uncut seedlings, however, were not stimulated, and concentrations of sulfanilamide which stimulated root formation in cut plants poisoned plants with normal root systems. This poisoning was very much like the conditions seen in frenching, tobacco plant disease for which scientists have never been able to discover the cause. It now appears that this disease may be due to poisoning with a substance similar in structure to sulfanilamide.

If sulfanilamide is to be used for fighting plant diseases, Dr. Spencer warned, it must be used in very much smaller doses than can be safely used in treating human patients.

Science News Letter, January 6, 1940

PSYCHIATRY

"Moral Treatment" in 1822 Start of Modern Mental Care

MODERN scientific treatment of the mentally diseased has its beginnings in the pioneering zeal of a young New England physician a century ago, it is recalled by a new book, *Mind Explorers* (Reynal and Hitchcock).

Young Eli Todd, in 1822, introduced in America the "moral treatment" of the mentally diseased. Unfamiliar with the modern term "occupational therapy," Dr. Todd nevertheless employed it to the great benefit of his patients, it is revealed by the authors of the book, John K. Winkler and Dr. Walter Bromberg.

The method as explained by Dr. Todd was to "treat them in all cases, as far as possible, as rational beings. To allow them all the liberty and indulgence compatible with their own safety. . . . To cherish in them the sentiments of self-respect . . . To draw out the latent sparks of . . . social affection. To occupy their attention, exercise their judgment and ingenuity, and to engage them in useful employments, alternated with amusements."

All this was new in New England in a day when mentally ill members of a household were hidden away in attics or even chained in outhouses.

Science News Letter, January 6, 1940

ARCHAEOLOGY

Ancient Eskimos Had Ways Unknown To Later People

AT POINT HOPE in Arctic Canada, Danish and American archaeologists have dug their way into an Eskimo village unlike any they had ever seen.

On the expedition were Dr. Froelich Rainey and Louis Giddings of the University of Alaska and Helge Larsen of the Danish National Museum.

At this place, now called Ipiutak, lived prehistoric Eskimos who conspicuously do not fit into the neat pattern of some five successive types of Eskimo culture that scientists have worked out.

These people had odd ideas of houses, by Eskimo standards. The expedition unearthed nine houses, finding them square or rectangular and made apparently of sod with logs and poles for framework. No stone or whalebone such as Eskimo builders ordinarily used. No long, narrow entrance passage for protection from cold. And no lamps! Eskimo women have always seemed inseparable from their lamps, which served as cook stoves, furnaces, for lighting, melting snow, drying clothes, and other uses. But these Eskimos had instead a central hearth where they burned wood and oil.

About 50 kinds of implements lay in buried wreckage of the homes, and only half are characteristically Eskimo. The rest are new to Arctic science. These Eskimos used no slate for blades, contrary to Eskimo custom. Flint was their leading material for drills, knives, and harpoon points. They had no pottery.

From style of decoration on their goods, these odd Eskimos belonged to the North in an early time. But their precise place in prehistory awaits a later decision.

Science News Letter, January 6, 1940

CHEMISTRY

Fur Replaced by Plastics In Making New Felt Hats

MAKING felt hats without fur, wool, or hair, is like making butter without cream, but it is the new achievement made possible by American chemists.

You have been hearing much about Vinyon and Nylon, the two new plastic materials made synthetically from coal, air and water, in connection with their use as fibers in chemical silk stockings that look and feel like natural silk but which will outwear the latter.

Newer and less-known is the important application of Vinyon as a resin powder in the fabrication of felt hats which look and feel like ordinary felt but contain not the slightest particle of fur or wool. Gone too is the lengthy process of felting, for the new felts are made by a dry process in which the batts are merely subjected to heat and pressure. The plastic materials fuse and cohere and bond the whole hat material into a commercial felt-like material.

Prize development of the use of plastics in the hatters' field so far is the creation of an all-cotton felt hat.

Science News Letter, January 6, 1940

ARCHAEOLOGY

Excavate a Settlement Of the New Stone Age

EXCAVATIONS of a New Stone Age settlement at Akropotamus in eastern Macedonia, a region that "saw plenty of action in the first world war," was reported to the Archaeological Institute of America by Dr. George E. Mylonas of the University of Illinois.

The settlement, dating back almost 3,000 years before Christ, is one of the few thus far yielding information of value about prehistoric Macedonia. Neglect of Macedonia's buried remains is regrettable, Dr. Mylonas declared, because the region was a corridor along which early tribes wandered, and therefore the earth holds the solution of many problems regarding the dawn of Greek civilization.

Finds at the New Stone Age site included an amulet in the shape of a foot made of clay, which Dr. Mylonas pronounced unique among New Stone Age relics, also pins and needles of bone, much pottery, figurines of clay, and stone celts. Dr. Mylonas excavated the site for the Washington University of St. Louis under auspices of the Greek Archaeological Society.

Science News Letter, January 6, 1940

ASTRONOMY

1940 Will Be Memorable

Spectacular Lining Up of Five Naked-Eye Planets Will Make Winter Evening Skies Gorgeous

By JAMES STOKLEY

FROM all indications, the year 1940 will probably be an important one, and astronomically it will be memorable as well.

The most spectacular event of the year that is visible all over the world will be the lining up of the five naked-eye planets in the western sky at the end of February. For the last few days of that month, and the beginning of March, they will be stretched out in a parade, with Mercury lowest, then Jupiter, Venus, Saturn and Mars above.

It is very rarely that all these planets can be seen at one time and especially so to have them in such a regular row.

As a matter of fact, it will be even more unusual than it might appear, because Uranus, the next planet out from Saturn, and just too faint to be seen without a telescope, will also be in the same line, above Mars, so the six brightest planets will take part in the formation. Only Neptune and Pluto will be left in other parts of the sky.

It will be a most interesting sight to watch the western sky night by night until this display appears, for then one can see how the planets slowly move into line.

The most important events of the year to the astronomer, however, will be the eclipses of the sun, especially the second.

The sun is eclipsed when the moon passes in front of it. Fortunately, it happens that, even though the sun is far larger than the moon, it is also much farther away, and hence they appear about the same size in the sky. However, the distance of each from the earth varies a little, and so the apparent size is subject to a similar change. Sometimes the moon appears a little bigger than the sun.

If an eclipse occurs at such an occasion, it is total, because then the sun is completely hidden.

But if it occurs when the sun is bigger, then, even though the moon passes in front, the former is not completely hidden. At the middle of the eclipse, one can see the outer edge of the sun as a ring around the black disc of the moon. This is called an annular eclipse, from the Latin word "annulus," meaning a ring.

Such an annular eclipse will be visible on April 7, along a path crossing northern Mexico and the southern United States. San Antonio, Austin, Houston, Baton Rouge, New Orleans, Pensacola, Tallahassee, Savannah and Jacksonville will be in this path. Over the rest of North America, except Alaska, and a large part of the Pacific Ocean, there will be seen a partial eclipse, in which the moon will cover one edge of the sun.

An annular eclipse is not of great scientific importance, because even the small remaining part of the sun's surface which is visible is bright enough to prevent astronomers from making the observations for which they will travel thousands of miles to see at a total eclipse. But it will be interesting to watch, and anyone who is interested in the events of the heavens, and is able to get to one of the cities mentioned above to see this should certainly arrange to do so.

The astronomers are concentrating on 1940's eclipse number two, for that will be total and unusually good. On Oct. 1 the sun will be completely hidden, along a path crossing the northern part of South America, including the city of Pernambuco (Recife) in Brazil, the Atlantic Ocean and the tip of South Africa. The partial eclipse will be visible over most of South America, Central America, Florida and Southern Africa.

Where this eclipse lasts longest, a point in mid-Atlantic, the sun will be covered for 5 minutes 35 seconds. This is not as long as the record-breaking eclipse of June 8, 1937, in the Pacific Ocean, which lasted for more than seven minutes.

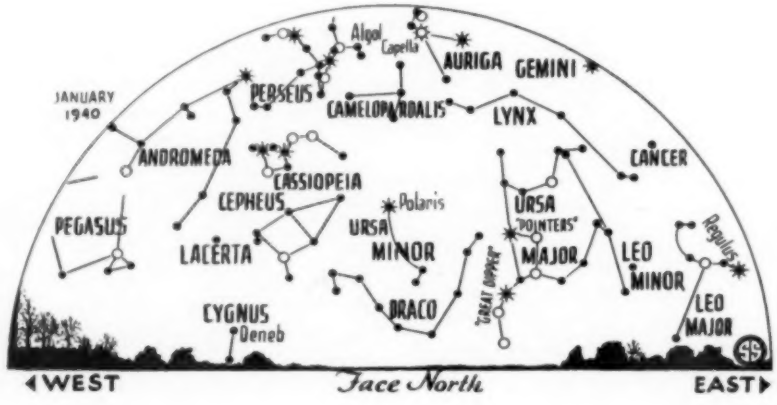
A small party did make observations from a boat at the point where it was longest, but these were limited. The longest land duration, where big instruments could be erected, was at Canton Island, for 3 minutes 33 seconds.

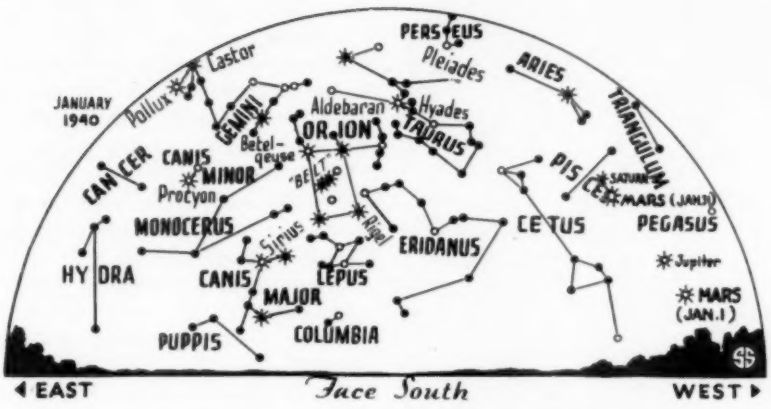
On the coast of Brazil, the eclipse of this year will be total for 4 minutes 45 seconds, while in South Africa it will last for 3 minutes 50 seconds.

Both of these locations are far more accessible than Canton Island, and so it is no wonder that many astronomical parties are planned to make observations from one point or the other.

Most of these will be to record the corona, the sun's outermost layer, which is fully visible only at a total eclipse. Others will be with the spectroscope, to learn more about the sun's atmosphere. Still others will record the changes of radio transmission through the moon's shadow. All told, a total eclipse of the sun offers the astronomer many opportunities, and they will take full advantage of them in October, if the weather is satisfactory.

The moon is not the only celestial object that passes in front of the sun. At rare intervals Venus does so, producing a "transit" of this planet. The last one was in 1882, and the next will occur in 2004. Transits of Mercury happen more often. The last was on May 11, 1937, and there will be one in 1940 on Nov. 11. This will not be visible to the naked





☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

eye, but if one has a telescope, equipped with an eyepiece that permits observation of the sun, the little planet will be seen to come in front of the mighty sun during the Armistice Day afternoon. As the sun sets in the United States, the planet will still be in front of it.

Just as the moon can hide the sun, so it can pass before a star or planet, and this is called an occultation. Two rather rare occultations of planets happen this year, but they are not visible throughout the United States. On June 30 Saturn will be occulted in the early morning hours, visible only in southwestern states. On the afternon of July 31 there will be a similar occultation of Venus, which will then be so bright it can be seen even in the daylight, especially with the aid of binoculars. This will be visible in western United States and Canada.

Most conspicuous of the objects to be seen in the January evening skies are the planets to the west, which are now beginning to line up for a most remarkable display which they will present at the end of February. The accompanying maps show them, as well as the stars that are seen at present. At ten o'clock on Jan. 1, nine o'clock on Jan. 15 and at eight on Jan. 31, the skies present this aspect. Mars is moving so rapidly that it is indicated for its place both on the first and thirty-first, while Saturn and Jupiter are in the position for the fifteenth. As they move so slowly, their position does not change noticeably during the month. In addition to these three, Venus is visible in the west for a while after sunset, but it goes down before the times of the maps.

Venus is the most brilliant of the planets and is so bright as it shines in the west that no one can possibly mistake it. Jupiter is next in brilliance. Mars and Saturn are considerably fainter, though still as bright as a star of the first magnitude. Mars passes Jupiter on Jan. 7, and at that time the two, shining so close together, will be a striking sight. During the month the moon, in a crescent phase, joins the picture. On Jan. 12 it passes Venus, on the 15th Jupiter, on the 16th Mars and on the 17th Saturn.

Turning now to the stars, we find that they, unlike the planets, appear the same as always at this time of year. High in the south shines Orion, the warrior, recognizable from the three "belt" stars. Betelgeuse, above, marks one of his shoulders; Rigel, below, one of his feet. Below and to the left is Sirius, brightest star in the night-time sky, which is even more brilliant than Jupiter, though not as bright as Venus.

Higher, and farther east, is Procyon, in Canis Minor, the lesser dog. Still higher is Pollux, which, with Castor, forms Gemini, the twins. Nearly overhead we see Capella, in Auriga, the charioteer. In the south, above and to the right of Orion, is Aldebaran, in Taurus, the bull.

Two other stars of the first magnitude are also visible. Coming up in the east, we see Regulus, in Leo, the lion. Low in the northwest, about to disappear from the evening skies for a while, is Deneb, in Cygnus, the swan.

Celestial Time Table for January

Monday, Jan. 1, 11:56 p. m., Moon at last quarter. **Tuesday, Jan. 2,** 1:00 a. m., Earth nearest sun; distance 91,343,000 miles. **Sunday, Jan. 7,** 10:00 a. m., Mars passes Jupiter. **Tuesday, Jan. 9,** 8:53 a. m., New moon. **Wednesday, Jan. 10,** 6:34 a. m., Algol at minimum brightness. **Friday, Jan. 12,** 8:23 a. m., Moon passes Venus. **Saturday, Jan. 13,** 3:23 a. m., Algol at minimum. **Sunday, Jan. 14,** 7:00 a. m., Moon farthest; distance 251,900 miles. **Monday, Jan. 15,** 5:02 p. m., Moon passes Jupiter. **Tuesday, Jan. 16,** 12:13 a. m., Algol at minimum; 2:07 a. m., Moon passes Mars. **Wednesday, Jan. 17,** 11:48 a. m., Moon passes Saturn; 1:21 p. m., Moon at first quarter. **Thursday, Jan. 18,** 9:02 p. m., Algol at minimum. **Sunday, Jan. 21,** 5:51 p. m., Algol at minimum. **Wednesday, Jan. 24,** 6:22 p. m., Full moon. **Friday, Jan. 26,** 6:00 a. m., Moon nearest; distance 223,900 miles. **Wednesday, Jan. 31,** 9:47 a. m., Moon at last quarter.

Eastern Standard Time throughout.

Science News Letter, January 6, 1940

ASTRONOMY

"Super-Shell" Stars Have Speeding Envelope

"SUPER-SHELL" stars, a class of celestial objects long observed but hitherto neglected by astronomers, were described by Dr. Ernest Cherrington of Ohio Wesleyan University to the American Association for the Advancement of Science. Their distinguishing character is an outer gaseous envelope or atmospheric shell that speeds away from the star itself with explosive velocities up to 70 kilometers (43.5) miles a second.

Spectrum photographs of these stars, technically known as the B and Be types, have been almost in the class of nuisances to astronomers, because some of their lines are fuzzy rather than clear and sharp. These faint and fuzzy lines proved, upon analysis, to be indicators of the existence and recessional speeds of the stars' "super shells."

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ASTRONOMY

Christmas Eve Nova Discovered at Harvard

A NOVA, or "new" star, similar to what the Star of Bethlehem may have been, was discovered on Christmas Eve by Dr. F. L. Whipple of the Harvard College Observatory. It was then of tenth photographic magnitude, and thus invisible to the naked eye. Evidence indicates that it flashed to its maximum brightness some time last summer, but for some reason it then eluded the watchfulness of astronomers. It is located in the minor constellation Monoceros, the Unicorn, near the southern horizon.

Science News Letter, January 6, 1940

● RADIO

W. H. Cameron, of the National Safety Council will tell how you can help reduce accidents as guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Thursday, January 11, 4:15 p.m., EST, 3:15 CST, 2:15 MST, 1:15 PST. Listen in on your local station. Listen in each Thursday.

BATTLE BLUE MOLD

Dr. F. R. Darkis of Duke University is demonstrating research on a serious foe of tobacco at the Columbus meetings.

PHYSIOLOGY—PSYCHOLOGY

Air Fighters Should Tank Up On Oxygen Before Ascents

Inhaling Gas Even During Sleep Will Prevent Development of Aeroembolism in Rapid Ascents

MILITARY pilots, especially those in interceptor squadrons, should keep themselves tanked up on oxygen, inhaling it even while they sleep, the American Association for the Advancement of Science was told at their meeting in Columbus. This will prevent the dangerous condition, aeroembolism, from developing during rapid ascents to high altitudes, Drs. W. Randolph Lovelace II and Walter M. Boothby and Captain O. Benson reported as the result of researches at the Mayo Clinic, Rochester, Minn.

Boring, gnawing pain about the joints, itching of the skin and eyelids, unconsciousness, convulsions, and paralysis, including paralysis of the breathing muscles, are among the symptoms of aeroembolism. Small blood vessels in the lungs may be plugged by emboli, thus cutting off the blood supply.

"It is easy to see what the result of such an attack would be to a pilot of a very fast and heavy airplane," the Mayo Clinic investigators point out.

The condition has been only recently discovered by Capt. Harry G. Armstrong, of the Medical Corps of the U. S. Army and director of the Aero Medical Research Laboratory at Wright Field, Dayton, Ohio. The disease, Captain Armstrong found, is produced by rapid decrease of atmospheric pressure below sea level conditions, such as may occur in flights to high altitudes. Nitrogen bubbles form in the blood and tissues. The symptoms of the disease depend primarily on where in the body these bubbles form and their size.

An altitude of 30,000 feet seems to be the critical point for development of aeroembolism. Symptoms appear at this altitude after a rate of ascent of only 200 feet per minute. Fat people are more susceptible than thin, muscular ones.

Recompression, that is, descent to a lower altitude where the atmospheric pressure is higher, is the treatment for the condition once it has occurred. This reduces the size of the nitrogen bubbles that are causing the trouble. At the same time, 100% oxygen should be inhaled.

But getting tanked up on oxygen while still on the ground prevents the condition. In the Mayo Clinic experiments, in which seasoned pilots of Northwest Airlines, Inc., took part, "ascents" to 40,000 feet at a rate of 4,000 feet per minute were safely made when the pilots had breathed pure oxygen for 30 minutes while walking two miles on a treadmill. These rapid experimental "ascents" were made in a low pressure chamber in which pressures of high altitudes could be produced. No plane now available, it is pointed out, can climb to 40,000 feet at a rate of 4,000 feet per minute.

Exercise speeds the tanking-up process. Military pilots who must be ready to take off at any moment might not have time for the preliminary exercise and oxygen inhalations, but they can tank up with no loss of time by breathing oxygen through a new type mask while they sleep.

Science News Letter, January 6, 1940

Key to Paralysis Prevention

THE KEY to infantile paralysis prevention may be held by either glands or diet, is the conclusion from the discovery announced at the meeting, that a natural barrier to passage of the disease-causing virus is induced by normal growth and maturing.

The virus barrier was reported by Dr. Albert Sabin, of the University of Cincinnati College of Medicine and the Children's Hospital Research Foundation, upon receiving the Theobald Smith award of the American Association for the Advancement of Science. Researches leading to discovery of the virus barrier were made by Dr. Sabin in association with Dr. Peter K. Olitsky at the Rockefeller Institute for Medical Research, New York City.

No way of creating the virus barrier which protects against attacks of infantile paralysis has been discovered yet, but gland and dietetic factors "are being investigated for their effect in accelerating or retarding the development of this resistance," Dr. Sabin told Science Service.

In his formal address he only described the virus barrier, stating that while "this mechanism may be only one among a number of others which operate in protecting the major portion of the animal and human population from disabling and fatal disease of the nervous system, it is especially interesting because it lends itself to the kind of experimental manipulation by which one may attempt to change susceptible individuals into resistant ones."

Only a very few of the people or animals that become infected with nerve-destroying viruses, such as those causing infantile paralysis or horse "sleeping sickness," for example, actually get sick. The majority, especially the older ones, are immune or resistant to the viruses. This resistance, Dr. Sabin explained, is not the kind you may get against germ diseases like tuberculosis, by frequent exposures to small doses of the germs. Neither is it dependent on development of disease germ-fighting antibodies in the blood. Instead, he and Dr. Olitsky have discovered, it depends "on the condition of some of the tissues which the virus must pass before the nervous system can become sufficiently involved to give rise to clinically apparent and fatal disease."

The resistance is probably due to changes in muscle cells and terminal nerve endings which set up barriers preventing the virus from invading the central nervous system (brain and spinal cord), where infantile paralysis and "sleeping sickness" viruses do their damage.

The barrier is found in most adult animals, but not in young ones. As mice grow older, Drs. Sabin and Olitsky found, they grow resistant to virus injected within the muscles, under the skin, within the abdomen, eyes or nose, but when the virus is injected directly into the brain, older mice are as likely as young ones to get the disease.

Since normal growth and maturation can induce the virus barriers in most animals, Dr. Sabin believes that the changes which naturally create the virus barriers are probably gradually brought about as a child or animal grows up by the action of his glands or by some factor in his diet.

Science News Letter, January 6, 1940

Cold Vaccine Getting Trial

SUCCESSFUL results from anti-cold vaccination in more than 3,000 persons were reported by Dr. Leonard J. Piccoli, Fordham University College of Pharmacy, New York. Another 3,000, who did not get the vaccine, had about four times as many colds during any experimental year as those who had taken the vaccine.

Large-scale trials of the vaccine on hundreds of thousands of employees in industry have been going on for the past three years in addition to Dr. Piccoli's own investigations. Further conclusive evidence of the value of the vaccine is expected from results of this large-scale trial.

The vaccine is made to be taken by mouth, thus avoiding the necessity of frequent visits to a physician. It is taken every day, either before breakfast or before retiring at night.

The vaccine is made, not from the virus which has been identified as the cause of the common cold, but from other germs found in cold patients. Whether it acts to stimulate resistance to germs in general or to offset the effects of these secondary germs that cause many complications of colds is not exactly known. Many physicians have reported that such a vaccine reduces the number and severity of colds. Cold vaccines, of course, should not be taken without consulting a physician.

Science News Letter, January 6, 1940

Revives Depressed Hearts

ADRENALIN, gland product frequently used with dramatic success to revive failing hearts, in apparently dying patients, can counteract the depressing effect on the heart of heavy water, Dr. T. Cunliffe Barnes, of Yale University, reported.

No dying patient's heart, but turtle's heart, classical material for study of cardiac properties, was used in Dr. Barnes' studies. The turtle's heart has a prolonged survival time when removed from the body, he explained.

Hearts (turtles') which stopped beating in 60% and 99% heavy water were stimulated to beat again by one in 50,000,000 parts of adrenalin.

"The results are of interest," Dr. Barnes pointed out, "in connection with the work of Dr. H. G. Barbour (Yale) showing that in mammals (mice) one-fifth saturation with heavy water makes the animal live faster with a 20% increase in metabolism. This is probably due to the prolonged protecting action of heavy water on adrenalin which is normally destroyed in the body. This protecting action is effective over several days in Dr. Barbour's experiments but is not evident in the two-hour experiments on the heart reported here."

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X-Rays Rescue CO Victims

X-RAY treatments may be "of critical value" in speeding recovery from carbon monoxide poisoning, Dr. John A. Cameron, of the University of Missouri, declared on the basis of results obtained with such treatment of monkeys and other animals, reported to the A.A.A.S.

Carbon monoxide is the odorless, colorless gas which takes many lives every winter when automobile engines are run in closed garages, or when defective gas and other heating appliances are used.

Monkeys exposed to concentrations of carbon monoxide that would otherwise have been fatal recovered rapidly when treated with moderate amounts of X-rays.

Young rats and rabbits, Dr. Cameron found, can withstand from six to 10 times as great exposures to carbon monoxide as adult animals. No such change of resistance with advancing age was found in such higher mammals as guinea pigs and monkeys.

Science News Letter, January 6, 1940

Ancient Man in Texas

NEW evidence that man lived in North America during the time of the mastodons and extinct American horses was reported by Dr. Elias H. Sellards, University of Texas geologist.

Excavating on the banks of Blanco Creek, in Bee County, Texas, Dr. Sellards found spearheads, scrapers, and other worked flints associated with the bones of extinct mammals fifteen feet below the present land surface. Similar fossils are found in comparable locations in this part of Texas, Dr. Sellards states.

At greater depths, in beds of Pliocene

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age, the time before the great ice ages, bones of extinct camels, horses, rhinoceroses and deer are found; along with mastodon bones, but no evidence of man.

Science News Letter, January 6, 1940

Neurotics May Be Geniuses

THE NEUROTIC person may be a potential genius who can reach far higher levels of achievement than can his more stable fellows if only his energies can be properly guided, Dr. Calvin S. Hall and Fred Y. Billingslea of Western Reserve University predicted.

In experiments with rats which by selection have been bred into families of emotionally unstable and emotionally stable animals, these investigators found that the unstable rats excelled in adjusting to all situations except those involving fear. In situations involving fear, the adjustment of the emotional rat is worse. This suggests that human neurotics have great potentialities.

Science News Letter, January 6, 1940

Paintings Work of Youth

WHEN you thrill to the beauty of the world's greatest oil paintings, you are looking at the work mostly of young men in their thirties.

A survey of great paintings as judged by the authors of more than sixty books on the best art works, conducted by Dr. Harvey C. Lehman, of Ohio University, revealed that the greatest number were created by men between the ages of 35 and 39.

Individual top-flight artists produced their masterpiece, their one best oil painting, between the time they were 30 and their 34th birthday, he told the meeting.

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Best etchings are also produced mainly by men in this same age group, although the artists are somewhat older by the time their work is first exhibited or published.

Outstanding examples of architectural work are most frequently contributed by men between 40 and 44 years old, he found.

Dr. Lehman's survey was a surprise to those who may have believed that critics are agreed on which paintings constitute the world's greatest art treasury.

Only one painting, he found, was listed among the best by as many as 12 different authors. Many were listed only once or twice in more than sixty books.

Because the works of young men might outnumber those of older artists simply because more artists are alive at the younger ages, Dr. Lehman allowed statistically for varying lengths of life in reaching his conclusion regarding the peaks of productiveness in the lifetimes of artists.

Science News Letter, January 6, 1940

Nervousness Meter

A NERVOUSNESS meter for humans, something like the electric meters used to measure the consumption of electricity in a home or other building, was demonstrated by Dr. Edmund Jacobson, of the Laboratory for Clinical Physiology, Chicago.

The nervousness meter records a person's nervous state by measuring the electric impulses generated by nerve or muscle activity. The meter is simple to operate and gives highly accurate results in terms of millionths of a volt, Dr. Jacobson reported. Fine wires are inserted into the tissue. The instrument is turned on by closing a certain switch, and a button is pressed which initiates the measurement of electrical impulses as they pass from the subject through the circuit.

A salesman, quiet and phlegmatic in type, gave a low voltage record, Dr. Jacobson reported by way of illustrating the results obtained in nervousness meter readings. A research director of the type commonly called dynamic gave a relatively high voltage record. A doctor's wife suffering from insomnia, overfatigue and nervousness had a record showing marked failure to relax when she lies down. A young woman recently afflicted with epileptic spells had a very high, irregular record. An apparently placid elevator man gave a surprising record, marked by very high voltages, when the nervousness meter reading was taken while he was reading a current magazine. The meter record shows, Dr. Jacobson said, that this man reads with great effort or inward activity.

Science News Letter, January 6, 1940

Folks Still Trust Parents

IN A WORLD torn by suspicion and lack of faith, scientists were told that people still put their trust in some things and in some people.

Men today trust their parents, Prof. A. S. Edwards of the University of Georgia, told the meeting. They trust friends, their physicians or their lawyers. They put faith in scientific inventions, laws and methods. They rely on their money.

Not so often do they trust religious objects, organizations of various kinds, government or civil laws.

Men, as compared with women, put their faith more in science and in government, Prof. Edwards found. Women trust religious objects.

With age some trusts are abandoned, some become weaker. New objects of trust are found. Many positive distrusts develop.

Science News Letter, January 6, 1940

A new and colorless asphalt product can be permanently dyed any color.

Tiny tarpon are rarely found, but some caught in Florida have been only a little over two inches long.

Prior to the war, Hamburg was a great shipping center for aquarium fish brought from many parts of the world.

● Earth Trembles

Information collected by Science Service from seismological observatories resulted in the location by the U. S. Coast and Geodetic Survey of the following preliminary epicenters:

Thursday, December 21, 3:54.7 a.m., and 11:44 p.m., EST

Off west coast of Costa Rica. Latitude 9 degrees north, longitude 85 degrees west. A strong shock.

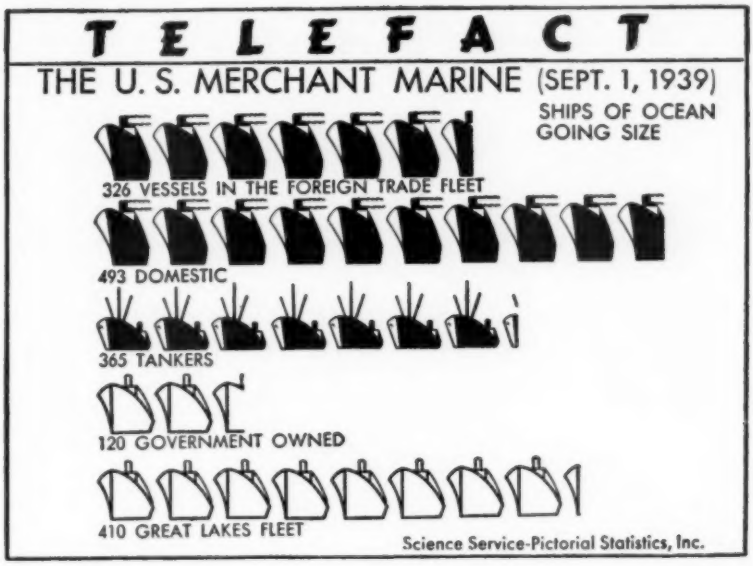
Thursday, December 21, 4:00.5 p.m., EST

On or near Celebes. Latitude 2 degrees south, longitude 122 degrees east.

Tuesday, December 26, 6:57.6 p.m., EST

In Asia Minor, about 100 miles southwest of the Turkish Black Sea port of Trebizond, almost directly under the large town of Erzincan. Latitude, 39 degrees north. Longitude, 39 degrees east. Severe shock resulting in thousands of deaths.

For stations cooperating with Science Service, the Coast and Geodetic Survey, and the Jesuit Seismological Association in reporting earthquakes recorded on their seismographs, see SNL Oct. 28, 1939.


TELEFACT
THE U. S. MERCHANT MARINE (SEPT. 1, 1939)
SHIPS OF OCEAN GOING SIZE
326 VESSELS IN THE FOREIGN TRADE FLEET
493 DOMESTIC
365 TANKERS
120 GOVERNMENT OWNED
410 GREAT LAKES FLEET
Science Service-Pictorial Statistics, Inc.

BIOLOGY

War Brings Renewed Danger Of Invasions By Insect Foes

Experienced Quarantine Officials Called to Colors May Be Replaced By Inexperienced Men; Hurry Involved

BOMBING PLANES and clanking tanks are not the only dangerous things that cross national boundaries when war comes. Invaders that stay on and continue their depredations even after human beings have cried quits are part of the hazards of war, Dr. E. R. Sasscer of the U. S. Department of Agriculture pointed out in his presidential address before the American Association of Economic Entomologists, meeting in Columbus with the American Association for the Advancement of Science.

After reviewing the attempts on the part of insects to invade and conquer America in the past, Dr. Sasscer called attention to the perils of the present situation.

"There are some who are prone to conclude that the disturbed shipping facilities, which result when wars are in progress, curtail the volume of imports and when such conditions obtain, the risk of importing injurious insects is insignificant. Our experience in the last World War does not support this theory, for during those turbulent days many of the experienced plant quarantine officials, in the countries involved, were called to the colors and their work turned over to less experienced inspectors, resulting in decreased efficiency.

"Furthermore, there is no assurance that a product normally imported from a certain European country will not be imported from another country when wars intervene to disrupt commercial relations. Indeed, it may be noted that the effects of the present war on the sanitary condition of certain types of plant material have already been evident, due perhaps to an effort to dispose of as many plants as possible while shipping conditions permitted."

Science News Letter, January 6, 1940

Tiny Insect Ally

HONORS were conferred on a tiny insect ally used by man in his ceaseless war against crop and orchard pests, when J. E. Webb, Jr., and C. H. Alden of the Georgia State Department of Entomology told how effective had been the aid of a gnat-sized wasplet known as *Trichogramma minutum* in abating the ravages of codling moth and fruit moth in Georgia's famous peach and apple orchards.

During the past ten years, they said, armies of these midget warriors totaling more than 300 millions have been raised and turned loose to range the orchards. They lay their microscopic eggs within the eggs of the moths, and the minute but hungry larvae destroy the pests by literally boring from within. Thousands of moth eggs have been collected and examined, with results showing that more than half the codling moth eggs, and well over a third of the fruit moth eggs, had been "torpedoed" by the little wasp.

Science News Letter, January 6, 1940

Mosquitoes Hibernate

MALARIA mosquitoes in the Tennessee Valley spend the winter in caves like bats, living on the accumulated fat stored in their bodies, it was announced by Drs. E. Harold Hinman and H. S. Hurlbut of the Tennessee Valley Authority. The specimens they found in their searchings were all adult females that had been mated, so that they were ready to develop and lay their eggs as soon as warm weather came.

"Hibernating females in caves have survived as long as 69 days without food," Dr. Hinman stated. "The temperature ranged from 51.5 to 59 degrees Fahrenheit between Dec. 16 and Jan. 27 in one cave where continuous record was kept. A renewal of reproductive activity occurs early in February and the overwintering females leave the caves at this time."

Science News Letter, January 6, 1940

Announcing the Giant
SPRING - YEAR BOOK - 1940
of GARDEN EXPERIMENTS

PARTIAL CONTENTS

SOILLESS GARDENING—newest information about this fascinating research.

COLCHICINE—full details for using revolutionary chemical to double chromosomes—create giant plants—doubled flowers, etc.

PHOTOSENSIN—remarkable dyestuff discovered by Dr. Joseph Sellei . . . its effect in plant photosynthesis.

VITAMIN B1—latest sensation and creator of "mystery" plants—directions for applying.

TROPICAL EDEN—a day on the most beautiful and unspoiled of the Florida Keys.

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First Glances at New Books

Zoology

THE BOOK OF FISHES (rev. and enl.)—John Oliver La Gorce, ed.—*National Geographic Soc.*, 367 p., $3.50. A tenth printing of one of the deservedly popular books of the National Geographic Society, with so much added pictorial and text material that it is practically a new book.

Science News Letter, January 6, 1940

Engineering

THE EFFECT OF RADIATION ON PSYCHROMETRIC READINGS—David Dropkin—*Cornell University Engineering Experiment Station*, 60 p., 60c. (Bulletin No. 26, Oct., 1939)

Science News Letter, January 6, 1940

Embryology

THE DEVELOPMENT OF THE HEART IN THE RAT—Paul L. Burlingame and J. A. Long—*Univ. of Calif. Press*, 70 p., 50c.

Science News Letter, January 6, 1940

Embryology

ORGANOGENESIS IN THE GASTEROPOD CREPIDULA ADUNCA SOWERBY — C. E. Moritz—*Univ. of Calif. Press*, 31 p., 50c.

Science News Letter, January 6, 1940

Embryology

THE EARLY EMBRYOLOGY OF TRITURUS TOROSUS—J. Frank Daniel and Evangeline A. Yarwood—*Univ. of Calif. Press*, 34 p., 50c.

Science News Letter, January 6, 1940

Zoology—Anatomy

THE ANATOMY OF THE BULL FROG—Richard R. Stuart—*Denoyer-Geppert*, 30 p., 50c.

Science News Letter, January 6, 1940

Education

EDUCATIONAL FILM CATALOG (2d. ed.)—Dorothy E. Cook and Eva Rahbek-Smith, comp.—*Wilson*, 332 p., $3.; with three quarterly supplements for 1940, and a bound cumulated annual, $4. Non-theatrical films, 2370 of them, listed, classified, described, telling where and how they may be obtained. Many science subjects.

Science News Letter, January 6, 1940

General Science—History

HISTORY AND SCIENCE, A Study of the Relation of Historical and Theoretical Knowledge—Hugh Miller—*Univ. of Calif. Press*, 201 p., $2. Two hundred pages of abstract words leading to the conclusions that "Totalitarian government is rejected as the parallel in social procedure to the false procedure of metaphysics" and that "The concept of progress is justified as the social attitude appropriate to an age that has accepted the fact of natural evolution, and that consequently entertains an increasingly historical conception of the world and man."

Science News Letter, January 6, 1940

Psychology

MARRIAGE AND FAMILY PROBLEMS AND HOW TO SOLVE THEM—John J. Anthony—*Doubleday, Doran*, 273 p., $1.98. By a radio adviser on marital problems.

Science News Letter, January 6, 1940

Radio

THE RADIO AMATEUR'S HANDBOOK, 1940 (17th ed.)—*American Radio Relay League*, 575 p., $1, paper; $2.50, buckram. No revised edition is this standard handbook of amateur radio. It has been entirely reworked and rewritten and out of the labor has come a better book. A "must" on the booklist of all radio amateurs.

Science News Letter, January 6, 1940

Physics

MOLECULAR SPECTRA AND MOLECULAR STRUCTURE, I. DIATOMIC MOLECULES—Gerhard Herzberg; trans. by J. W. T. Spinks—*Prentice-Hall*, 592 p., $6.50. For the graduate student in physics and the experts is this comprehensive summary of investigations in the important field of molecular spectra and structure.

Science News Letter, January 6, 1940

Psychology

PSYCHOLOGY, The Science of Behavior—Karl F. Muenzinger — *World Press*, 270 p., $2.25. A paper-bound volume by the professor of psychology at the University of Colorado.

Science News Letter, January 6, 1940

Sociology

WHAT WILL SOCIAL SECURITY MEAN TO YOU?—Bion H. Francis—*American Institute for Economic Research*, 96 p., $1. Telling, with typical examples, how the new provisions of the Social Security Act affect the insurance needs of individuals and what each one may expect in benefits.

Science News Letter, January 6, 1940

Chemistry

COLLOID CHEMISTRY—Robert J. Hartman—*Houghton Mifflin*, 556 p., $4.75. For chemistry majors and other serious students in this introductory text to colloidal chemistry which is abundantly footnoted with citations from the technical literature and skillfully illustrated with excellent charts and drawings.

Science News Letter, January 6, 1940

Psychiatry

THE LANGUAGE OF THE DREAM—Emil A. Gutheil—*Macmillan*, 286 p., $3.50. Freudian interpretations so written that they are understandable and interesting to the layman.

Science News Letter, January 6, 1940

Political Science

THE NAZI DISEASE—Jay J. M. Scandrett—*Christopher*, 141 p., $1.50. Violently anti-Nazi.

Science News Letter, January 6, 1940

Psychology

HOW TO USE PSYCHOLOGY IN EVERYDAY LIVING—William S. Casselberry—*Ivan Deach, Jr., Pub., Burbank, Calif.*, 324 p., $2.50. A consulting psychologist offers practical advice for the layman.

Science News Letter, January 6, 1940

Psychology

THE RHYME OF REASON — Roger W. Holmes — *Appleton-Century*, 516 p., $3.75. An "invitation to accurate and mature thinking" by the associate professor of philosophy at Mount Holyoke College.

Science News Letter, January 6, 1940

Sociology

SCIENTIFIC SOCIAL SURVEYS AND RESEARCH—Pauline V. Young and Calvin F. Schmid—*Prentice-Hall*, 619 p., $3. A textbook including material on field observation, interviews, photography as an observation technique and methods for the statistical handling of data.

Science News Letter, January 6, 1940

Psychic Research

THE MYSTERY OF THE BURIED CROSSES—Hamlin Garland—*Dutton*, 351 p., $3.75. The author reports the discovery through the aid of spirits and mediums, of a large number of buried crosses and crucifixes.

Science News Letter, January 6, 1940

Invention

PATENT FUNDAMENTALS — Adelbert Schapp—*Industrial Press*, 176 p., $2. What can be patented and how to do it, as described by a patent attorney. Just the kind of information everyone needs who contemplates taking out a patent on some "long cherished invention".

Science News Letter, January 6, 1940

Psychiatry

MIND EXPLORERS—John K. Winkler and Walter Bromberg—*Reynal & Hitchcock*, 378 p., $3. See page 9.

Science News Letter, January 6, 1940